

**I. General Information**

CAS Number: 105-08-8  
 Name: 1,4-Cyclohexanedimethanol  
 Cyclohex-1,4-ylenedimethanol  
 Cyclohex-1,4-ylendimethanol  
 1,4-Bis(hydroxymethyl)cyclohexane  
 1,4-Dimethylolcyclohexane  
 1,4-Cyclohexamethylenebis methylol  
 Cyclohexane, 1,4-(hydroxymethyl)  
 CHDM

**II. Physical-Chemical Data****A. Melting Point**

<b>Test Substance</b> Test substance: Remarks:	1,4-Cyclohexanedimethanol Purity unknown
<b>Method</b> Method: GLP: Year: Remarks:	Not Specified Unknown Unknown
<b>Results</b> Melting point value: Remarks:	41-61 °C Data obtained from Hazardous Substances Data Bank Number: 5364
<b>References</b>	Hawley, G.G. The Condensed Chemical Dictionary. 9th ed. New York: Van Nostrand Reinhold Co., 1977. 247
<b>Other</b>	Last revision date: 20010809

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**B. Boiling Point**

<b>Test Substance</b> Test substance: Remarks:	1,4-Cyclohexanedimethanol Purity unknown
<b>Method</b> Method: GLP: Year: Remarks:	Not Specified Unknown Unknown
<b>Results</b> Boiling point value: Pressure: Remarks:	286.0 °C (cis-isomer), 283.0 °C (trans-isomer), 735 mmHg
<b>Data Quality</b> Remarks:	Data obtained from Hazardous Substances Data Bank Number: 5364
<b>References</b>	Hawley, G.G. The Condensed Chemical Dictionary. 9th ed. New York: Van Nostrand Reinhold Co., 1977, 247.
<b>Other</b>	Last revision date: 20010809

**C. Vapor Pressure**

<b>Test Substance</b> Test substance: Remarks:	1,4-Cyclohexanedimethanol
<b>Method</b> Method: Remarks:	Estimation Modified Grain Method
<b>Results</b> Vapor pressure value: Temperature: Remarks:	0.000371 mmHg 25 °C
<b>Data Quality</b> Remarks:	
<b>References</b>	MPBPWIN v1.40; Meylan, W. (1993). User's Guide for the Estimation Programs Interface (EPI), Version 3.10, Syracuse Research Corporation, Syracuse, New York 13210.
<b>Other</b>	

**D. Partition Coefficient**

<b>Test Substance</b> Test substance: Remarks:	1,4-Cyclohexanedimethanol
<b>Method</b> Method: Remarks:	Estimation
<b>Results</b> Log K <sub>OW</sub> : Remarks:	1.49
<b>References</b>	KOWIN v1.66; Meylan, W. (1993). User's Guide for the Estimation Programs Interface (EPI), Version 3.10, Syracuse Research Corporation, Syracuse, New York 13210.
<b>Other</b>	

**E. Water Solubility**

<b>Test Substance</b> Test substance: Remarks:	1,4-Cyclohexanedimethanol
<b>Method</b> Method: Remarks:	Estimation
<b>Results</b> Value: Temperature: Description: Remarks:	4,312 mg/L 25 °C Slight (1-10 g/L) A K <sub>ow</sub> of 1.49 was used in the estimation
<b>References</b>	WSKOW v1.40; Meylan, W. (1993). User's Guide for the Estimation Programs Interface (EPI), Version 3.10, Syracuse Research Corporation, Syracuse, New York 13210.
<b>Other</b>	

### III. Environmental Fate Endpoints

#### A. Photodegradation

<b>Test Substance</b> Test substance: Remarks:	1,4-Cyclohexanedimethanol
<b>Method</b> Method: Test type: Remarks:	Estimation Atmospheric oxidation
<b>Results</b> Temperature: Hydroxyl radicals reaction OH Rate constant: Half-life Ozone reaction: Remarks:	25 °C  21.1941 x 10 <sup>-12</sup> cm <sup>3</sup> /molecule-sec 0.505 Days (12-hr day; 1.5x10 <sup>6</sup> OH/cm <sup>3</sup> ) No ozone reaction estimation
<b>Conclusions</b>	Material is oxidized by hydroxyl radicals in the atmosphere at a rapid rate.
<b>Data Quality</b> Remarks:	
<b>References</b>	AopWin v1.90; Meylan, W. (1993). User's Guide for the Estimation Programs Interface (EPI), Version 3.10, Syracuse Research Corporation, Syracuse, New York 13210.
<b>Other</b>	

**B. Stability in Water**

<b>Test Substance</b> Test substance: Remarks:	1,4-Cyclohexanedimethanol Purity was unknown, but is typically greater than 99%.
<b>Method</b> Method: Test type: GLP: Remarks:	OECD-111 and EEC Annex V, Part C.7. Abiotic Degradation: Hydrolysis as a Function of pH Yes Test material, at a concentration of 0.1 g per 50 ml, was monitored for percent hydrolysis over a time period of 0, 2.4 and 120 hours in solutions of pH 4, 7, and 9. The test was performed at 50 °C.
<b>Results</b> Half-life: Percent hydrolyzed in 5- days (120 hrs) at 50 °C : Remarks:	Not determined  <1%
<b>Conclusions</b>	Material was not hydrolyzed under acidic, neutral or basic conditions after a 5-day exposure at 50 °C.
<b>Data Quality</b> Remarks:	This study followed OECD guidelines and was conducted under GLP assurances.
<b>References</b>	Abiotic Degradation: Hydrolysis as a Function of pH. HAEL Study# 99-0204, Report No.: L11592-HYD. Eastman Kodak Company, Rochester, NY. March 29, 2000.
<b>Other</b>	

### C. Biodegradation

<b>Test Substance</b> Test substance: Remarks:	1,4-Cyclohexanedimethanol Purity was 99.8%
<b>Method</b> Method: Test type: GLP: Year: Contact time: Inoculum:  Remarks:	OECD: TG-302B Zahn-Wellens/EMPA test for inherent biodegradability Yes 1995 19-days Mixed-liquor suspended solids from Van Lare waste water treatment plant, Rochester, NY; unacclimated Test article (50 mg DOC/L) and positive control were run in duplicate using 2L Erlenmeyer flask. Another flask was used as a blank control. Test solutions were agitated with magnetic stir bars and protected from light by aluminum foil. Dissolved oxygen, pH, and DOC analysis were determined on days 1, 3, 6, 8, 10, 14, 17, and 23.
<b>Results</b> Degradation %: Time for 10% degrad.: Classification: Breakdown products: Remarks:	98% decrease in DOC (Day 19) Approximately 6 days Material is inherently biodegradable under the definition of this test. Not determined Positive control had a DOC removal exceeding 70% within 14-days. This fulfills the requirements of a valid test.
<b>Conclusions</b>	Results indicate material would not be expected to be persistent in the environment. Test article does not require any European Union labeling statement relating to long-term effects.
<b>Data Quality</b> Remarks:	This was a well-documented OECD guideline study conducted under GLP assurances.
<b>References</b>	Determination of Inherent Biodegradability (Biotic Degradation) Using the Zahn/Wellens/EMPA Test; Environmental Sciences Section, Health and Environment Laboratories, Eastman Kodak Company, Rochester, NY; Study No. EN-111-907566-1, June 16, 1995.
<b>Other</b>	

**D. Transport between Environmental Compartments (Fugacity)**

<b>Test Substance</b> Test substance: Remarks:	1,4-Cyclohexanedimethanol										
<b>Method</b> Test type: Model used:  Remarks:	Estimation Level III Fugacity Model; EPIWIN:EQC from Syracuse Research Corporation										
<b>Results</b> Model data and results: Estimated distribution and media concentration (levels II/III):  Remarks:	<table><thead><tr><th></th><th>Concentration (%)</th></tr></thead><tbody><tr><td>Air</td><td>1.54</td></tr><tr><td>Water</td><td>46.6</td></tr><tr><td>Soil</td><td>51.8</td></tr><tr><td>Sediment</td><td>0.098</td></tr></tbody></table> <p>Physical chemical values utilized in this model were default values obtained from the EPIWIN program.</p>		Concentration (%)	Air	1.54	Water	46.6	Soil	51.8	Sediment	0.098
	Concentration (%)										
Air	1.54										
Water	46.6										
Soil	51.8										
Sediment	0.098										
<b>Conclusions</b>											
<b>Data Quality</b> Remarks:											
<b>References</b>	Meylan, W. (1993). User's Guide for the Estimation Programs Interface (EPI), Version 3.10, Syracuse Research Corporation, Syracuse, New York 13210. The Level III model incorporated into EPIWIN is a Syracuse Research Corporation adaptation of the methodology described by Mackay <i>et al.</i> 1996; <i>Environ. Toxicol. Chem.</i> <b>15</b> (9), 1618-1626 and 1627-1637.										
<b>Other</b>											

#### IV. Ecotoxicity

##### A. Acute Toxicity to Fish

<b>Test Substance</b> Test substance: Remarks:	CHDM-D90 (1,4-Cyclohexanedimethanol) Test material (CHDM-D90) is a solution of CHMD (purity of 99.8%) 90% in water (10%).
<b>Method</b> Method: Test type: GLP: Year: Species/strain: Analytical monitoring: Exposure period: Remarks:	OECD 203 and EEC/Annex V C.1. Static Yes 1999 Fathead minnow ( <i>Pimephales promelas</i> ) Yes; Exposure solutions, temperature, pH, dissolved oxygen 96-Hour Biological loading was kept below 1.0 g wet weight per liter of test solution, with 14 fish used per exposure level.
<b>Results</b> Nominal concentration: Measured concentration: Endpoint value: Biological observations:  Statistical methods: Remarks:	120 mg/L 125.3 mg/L 96-hour $LC_{50} > 125.3$ mg/L No mortality was observed throughout the 96-hour exposure in the control or test substance  NA due to no mortality occurring The determinations of the $LC_{50}$ values were based on the arithmetic average (for replicates A and B) of the geometric means of the 0 and 96-hour test substance analytical results. The tests were performed in glass chromatography jars containing 20 L of exposure solution. Exposure temperature ranged from 19-20 °C, pH ranged from 8.2 to 8.5, and dissolved oxygen ranged from 8.2 to 9.0 mg/L. Stability determined by analysis of exposure concentrations by GC/FID.
<b>Conclusions</b>	The 96-hour $LC_{50}$ value indicates that the test substance would not be classified according to the European Union's labeling directive and would correspond to a "low concern level" according to the U.S. EPA's assessment criteria.
<b>Data Quality</b> Reliability: Remarks:	Reliable without restrictions This was a well-documented OECD guideline study conducted under GLP assurances.
<b>References</b>	An Acute Aquatic Effects Test with the Fathead Minnow ( <i>Pimephales promelas</i> ); Environmental Sciences Section, Health and Environment Laboratories, at Eastman Kodak Company, Rochester, NY; HAEL No. 99-0207; December 20, 1999.
<b>Other</b>	

**B. Acute Toxicity to Aquatic Invertebrates**

<b>Test Substance</b> Test substance: Remarks:	1,4-Cyclohexanedimethanol Unknown
<b>Method</b> Method: Test type: GLP: Year: Species/strain: Analytical monitoring:  Test details: Remarks:	Other Acute No 1978 Daphnia magna Temperature, dissolved oxygen, and pH were measured at test initiation (time 0) and at test termination (96 hours) 96-hour static test, 10 organisms exposed
<b>Results</b> Nominal concentration: Measured concentration: Endpoint value: Biological observations: Statistical methods: Remarks:	100 mg/L Not measured 96-hour LC <sub>50</sub> > 100 mg/L No mortality was observed NA
<b>Conclusions</b>	The 96-hour LC <sub>50</sub> value indicates that the test substance would not be classified according to the European Union's labeling directive and would correspond to a "low concern level" according to the U.S. EPA's assessment criteria.
<b>Data Quality</b> Reliability: Remarks:	Reliable with restrictions This was an older study without measured test substance concentration and limited documentation.
<b>References</b>	Aquatic Toxicity Report, Health and Safety Laboratory, at Eastman Kodak Company, Rochester, NY; Study No. HSL 77-179; October 31, 1978
<b>Other</b>	During this study ten organisms each of three other species were also exposed at the 100 mg/L nominal concentration for 96-hours. The species were <i>Dugesia tigrina</i> , <i>Helisoma trivolvis</i> , and <i>Pimephales promelas</i> . No mortality was observed in any of these species.

### C. Toxicity to Aquatic Plants

<b>Test Substance</b>	
Test substance:	CHDM-D90 (1,4-Cyclohexanedimethanol)
Remarks:	Test material (CHDM-D90) is a solution of CHMD (purity of 99.8%) 90% in water (10%).
<b>Method</b>	
Method:	OECD: TG-201 and EEC/Annex V C.3
Test type:	Growth inhibition of algae
GLP:	Yes
Year:	2000
Species/strain:	<i>Selenastrum capricornutum</i>
Endpoint basis:	Cell concentrations (biomass) and growth rate
Exposure period:	72-hours
Analytical procedures:	Temperature, light intensity, rpm, and test substance concentration were assessed at the 0, 24, 48, and 72 hours. The pH was assessed at time 0 and after 72 hours.
Remarks:	The concentration of algae at Day 0 was $10^4$ cells/ml.
<b>Results</b>	
Nominal concentration:	120 mg/L
Measured concentration:	122.9 mg/L (geometric mean)
Endpoint value:	The estimated $E_bC_{50}$ and $E_rC_{50}$ (0-72 hr) > 122.9 mg/L
NOEC:	72-hour NOEC = 122.9 mg/L
Biological observations:	No deformed cells were noted
Was control response satisfactory:	Yes (a 105 fold increase in cell number was observed)
Statistical Methods:	NA, The statistical analysis of the data was not necessary as inhibition in biomass or growth rate was not observed.
Remarks:	A mean illumination of 747 foot-candles was maintained. The mean temperature was 24°C and pH ranged from 7.42 to 7.65. Cultures were oscillated at 100 rpm. Test substance and cell concentrations were determined at test initiation and at 24-hour intervals during the test. The exposure concentration was calculated as the geometric mean of the test substance solutions analyzed at test start and at 24-hour intervals. The test substance was stable under the conditions of the test as -3.1% loss was observed over 72 hours. No protocol deviations were noted.
<b>Conclusions</b>	
	The 72-hour $E_bC_{50}$ and $E_rC_{50}$ values indicate that, based on this study, the test substance would not be classified according to the European Union's labeling directive and would be classified as a "low concern level" according to the U.S. EPA's assessment criteria.
<b>Data Quality</b>	
Reliability:	Reliable without restrictions
Remarks:	This was a well-documented OECD-study conducted under GLP assurances
<b>References</b>	
	A Growth Inhibition Test with the Alga, <i>Selenastrum capricornutum</i> ;
	Environmental Sciences Section, Health and Environment Laboratories,
	Eastman Kodak Company, Rochester, NY; Study No. EN-512-097566-A;
	January 3, 2000.
<b>Other</b>	

## V. Toxicological Data

### A. Acute Toxicity

<p><b>Test Substance</b>  Test substance:  Remarks:</p> <p><b>Method</b>  Method:  Test type:  GLP:  Year:  Species/strain:  Route of exposure:  Dose levels:  Remarks:</p> <p><b>Results</b>  Value:  Deaths at each dose:  Remarks:</p> <p><b>Conclusions</b></p> <p><b>Data Quality</b>  Reliability:  Remarks:</p> <p><b>References</b></p> <p><b>Other</b></p>	<p>1,4-Cyclohexanedimethanol  Purity was unknown</p> <p>Acute lethality; Other  LD<sub>50</sub> estimate  No (Pre-GLP)  1965  Rat  Oral gavage  400-6400 mg/kg  The report indicated that there were 10 animals used. It is not if this means 10/dose or 10 total.</p> <p>LD<sub>50</sub> approx. 3200 - 6400 mg/kg.  The report denotes the occurrence of a death at 1 hour (assumed to be in the highest dose group). Total number of deaths was not reported.  Animals were noted as appearing normal to very weak with prostration and vasodilatation. A gain in weight was reported after the 2-week study observation period was complete.</p> <p>Material would be considered as slightly toxic.</p> <p>Reliable with restrictions  The study was conducted quite some time ago and hence many study details are missing from the report and not available. However, basic data are given and results indicate the material is not acutely toxic.</p> <p>Toxicity Report, Laboratory of Industrial Medicine, Eastman Kodak Company, Rochester, NY. 10-12-65.</p> <p>Results of studies conducted in 1957, 1960 and 1962 at this same laboratory reported LD<sub>50</sub>'s of approximately 1600 - 3200 mg/kg, &gt;1600 mg/kg (highest dose tested) and 3200 mg/kg respectively. In these studies, the animals exhibited similar clinical signs as noted above with some deaths noted at 3,200 mg/kg. The exact number of deaths was not reported in the data and all reports were limited in the amount of methodology and detail present. (Toxicity Report, Laboratory of Industrial Medicine, Eastman Kodak Company, Rochester, NY; February 21, 1957, October 1, 1960, and March 30, 1962.</p>
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## B. Repeated Dose Toxicity

<b>Test Substance</b> Test substance: Remarks:	CHDM-D90 (1,4-Cyclohexanedimethanol) Test material (CHDM-D90) is a solution of CHMD (purity of 99.8%) 90% in water (10%).
<b>Method</b> Method: Test type: GLP: Year: Species/strain: Route of exposure: Duration of test: Exposure levels: Sex: Exposure period: Post-exposure observation period: Remarks:	OECD: TG-408 Repeated oral-dose toxicity Yes 2000 Rat/Sprague-Dawley[CrI:CD(SD)IGS BR Oral, in drinking water 13-weeks 0, 4.0, 8.0, and 12.5 mg/ml Male and female Continuous in water None Rats, 12/males/dose and 10 females/dose, were approximately 8 weeks in age and weighed 261 g (males) and 188 g (females) at study initiation. This study was combined with an OECD: TG-421 study and included a satellite group of 12 females/dose for assessing reproductive effects. Clinical observations were conducted daily except for specific days (1x/week) in which a more detailed functional observation battery (FOB) was performed in which animals were observed for: discharges (lacrimation salivation), piloerection, papillary size, exophthalmus, mucous membrane color, respiratory pattern, feces and urine characteristics, general body posture, movement, and behavior. Prior to study initiation and at Week 13 they were evaluated for sensory function (vision and audition), proprioceptive reflex, limb grip strength and motor activity determination. Animals and feed intake were weighed on a weekly basis. Whereas, water and determination of test material intake, was assessed bi-weekly. Urinalysis (color, clarity, output, specific gravity, pH, and the presence of glucose, protein, and blood) was conducted on Day 80 (males) and Day 84(females) through an overnight stay in metabolism cages. Complete Guideline-prescribed hematological, clinical chemistry, and tissue pathology (organs weighed and histologically examined) was conducted.
<b>Results</b> NOAEL (NOEL): Actual doses received:  Toxic responses by dose:	479 mg/kg (males) and 754 mg/kg (females) The approximate daily dose levels achieved were 0, 256, 479, 861 mg/kg (males) and 0, 440, 754, 1754 mg/kg (females). High dose rats were inflicted with mortality (2), bloody or brown/red discolored urine, softened and/or reduced feces, reductions in body weights and weight gains, decreased feed consumption, and increased urinary protein levels. No treatment-related effects noted in animals receiving the mid and low dose levels. Any changes noted were not considered to be toxicologically or biologically relevant as they were within normal variation or did not occur in a dose related manner.

Statistical methods:	Mean values of most data were evaluated for homogeneity by Bartlett's test and analyzed for significance using one-way ANOVA and Duncan's multiple range test. Some data were evaluated using a repeated-measures/multivariate analysis of variance and test for linear trend were assessed with linear regression. Non-homogeneous data were evaluated using Kruskal-Wallis H-test followed by Mann-Whitney U-test. Some FOB data were analyzed using a two-way or multiway frequency table analysis, along with Fisher's Exact test or Likelihood Ratio Chi-Square comparison.
Remarks:	
<b>Conclusions</b>	CHDM induced minimal toxicity following 13-weeks of exposure.
<b>Data Quality</b>	
Reliability:	Reliable without restrictions
Remarks:	This is a well-documented study that followed OECD guidelines and was conducted under GLP assurances.
<b>References</b>	A Thirteen-Week Oral Toxicity Study and Reproduction/Developmental Toxicity Screening Test in the Rat. Toxicological Sciences Laboratory, Health and Environment Laboratories, Eastman Kodak Company, Rochester, NY; Laboratory Project ID: 990207F2, November 6, 2000.
<b>Other</b>	

### C. Genetic Toxicity - Mutation

<b>Test Substance</b>	
Test substance:	1,4-Cyclohexanedimethanol
Remarks:	Purity unknown
<b>Method</b>	
Method:	Other; OECD: TG-471-like
Test type:	<i>In vitro</i> mutagenicity
GLP:	No
Year:	1977
Species/strain:	<i>Salmonella typhimurium</i> (strains: TA98, 100, 1535, 1537, and 1538) and <i>Saccharomyces cerevisiae</i> (strain: D4)
Metabolic activation:	Yes; Sprague-Dawley rat liver S9 induced with Aroclor 1254
Concentration tested:	0.1, 1.0, 10, 100, 500 ug/plate
Remarks:	Positive controls: methylnitrosoguanidine, 2-nitrofluorene, quinacridine mustard, 2-anthramine, 2-acetylaminofluorene, and 8-aminoquinoline.
	Negative control was the test vehicle dimethylsulfoxide. The study was performed with only one plate per concentration.
<b>Results</b>	
Result:	No positive responses were induced by 1,4-Cyclohexanedimethanol in any of the tester strains
Cytotoxic concentration:	Cytotoxicity was assessed but a specific concentration in which it occurred was not noted.
Precipitation concentration:	No precipitate was noted.
Genotoxic effects	
With activation:	Negative
Without activation:	Negative
Statistical methods:	Specific methods were not noted in the report. However, analyses were not needed due to the absence of an increase in the number of revertants colonies at any dose beyond the positive control.
Remarks:	
<b>Conclusions</b>	Material was not genotoxic under conditions of this assay.
<b>Data Quality</b>	
Reliability:	Reliable with restrictions
Remarks:	This was a fairly well documented study that followed the basic principles of those outlined in OECD guideline 471. However, some pertinent data were not in the report.
<b>References</b>	Mutagenicity Evaluation of CHDM-R-70T Compound 76-287; Litton Bionetics, Inc., Kensington, MD; LBI project No.: 2683; January 31, 1977.
<b>Other</b>	

**D. Genetic Toxicity – Chromosomal Aberrations**

<b>Test Substance</b> Test substance: Remarks:	1,4-Cyclohexanedimethanol Purity was 99.8%
<b>Method</b> Method: Test type: GLP: Year: Species/strain: Sex: Route of exposure: Dose levels: Exposure period: Remarks:	OECD: TG-475 Aberration assay in rat bone marrow cells Yes 2000 Rat/Crl:CD(SD)IGS BR Male and Female; 5/sex Oral gavage 0 (water vehicle), 500, 1000, and 2000 mg/kg 18 and 42 hours Positive controls consisted of cyclophosphamide exposure. A sample of 100 metaphase cells from each animal was scored. Percent polyploidy and endoreduplication were also tabulated by evaluating 100 metaphases per animal. A mitotic index was calculated based on the number of cells in mitosis per 1000 cells observed.
<b>Results</b> Result:  Genotoxic effects: Statistical methods:  Remarks:	No significant increases in cells with chromosomal aberrations or polyploidy, or endoreduplication were observed. Negative Statistical analysis employed analysis of variance to compare positive control to the vehicle control. Levene's test was performed to test for variance homogeneity and data were ranked if found to be heterogeneous. Dunnett's t-test was performed to compare treated means to the vehicle control. Additional test were conducted to evaluate any possible dose response (linear regression, Terpstra-Jonckheere). There were no mortalities observed and no animals exhibited any clinical signs indicative of toxicity prior to their termination.
<b>Conclusions</b>	Material was not genotoxic under conditions of this assay.
<b>Data Quality</b> Reliability: Remarks:	Reliable without restrictions This was a well-documented OECD guideline study conducted under GLP assurances.
<b>References</b>	Chromosomal Aberrations in vivo in rat bone marrow cells with EC99-0207, CHDM-D90. Covance Laboratories Inc., Vienna, VA; Study number: 20820-0-452OECD, March 16, 2000.
<b>Other</b>	

## E. Developmental Toxicity

<b>Test Substance</b>	
Test substance:	CHDM-D90 (1,4-Cyclohexanedimethanol)
Remarks:	Test material (CHDM-D90) is a solution of CHMD (purity of 99.8%) 90% in water (10%).
<b>Method</b>	
Method:	OECD: TG-421
GLP:	Yes
Year:	2000
Species/strain:	Rat/Sprague-Dawley[CrI:CD(SD)IGS BR
Sex:	Male and female
Route of exposure:	Oral, in drinking water
Exposure levels:	0, 4.0, 8.0, and 12.5 mg/ml
Actual doses received:	The approximate daily dose levels achieved were 0, 256, 479, 861 mg/kg (males) and 0, 385, 854, 1360 mg/kg (females).
Exposure period:	Continuous in water
Duration of test:	Pre-mating (56 days), mating (up to 14 days), gestation (21-22 days), and early lactation (4 days).
Remarks:	Rats, 12/sex/dose were approximately 8 weeks in age and weighed 261 g (males) and 188 g (females) at study initiation. This study was combined with an OECD: TG-408 13-Week repeated exposure study. Rats were mated 1:1 within the same dose group. All animals were weighed on Days 0, 7 and at least weekly through the mating period. Females were weighed on Days 0, 7, 14 and 20 of gestation, and on Days 0 and 4 postpartum. Body weights for pups were measured as a group and by gender on Days 0, 1, and 4. Feed was measured weekly except during the mating period and on Days 0, 7, 14 and 20 of gestation, and on Days 0 and 4 postpartum. Water consumption was determined on Days 0, 7, 14 and 20 of gestation, and on Days 0 and 4 postpartum. The following organs were histologically examined: ovaries, vagina, uterus, Fallopian tubes, and testes, epididymis, and male accessory sex organs. The testes and epididymis were also weighed. Sperm motility was assessed using sperm harvested from the right epididymis while the left epididymis and testes served as a source of total sperm counts.
<b>Results</b>	
Maternal toxicity NOEL:	854 mg/kg
NOEL for teratogenicity:	1360 mg/kg
NOEL for fetotoxicity:	854 ppm NOEL
Parental toxic responses:	High dose animals exhibited several clinical abnormalities (bloody or discolored urine, reductions in body weights and weight gains, decreased feed consumption) that, for females, persisted through lactation. Mid-dose females also exhibited a decrease in food consumption during lactation Days 0 – 4. One male and one female from the high dose group were euthanized <i>in extremis</i> during the pre-mating period. There was no effect noted in any organ weights harvested and histologically examined. There was no effect on epididymal or testicular sperm counts. A decrease in sperm motility was noted in some males at the highest dose. Although the reduction was not statistically significant, it was deemed as biologically significant. Nevertheless there were no reductions in any of the fertility parameters or indices examined.

Fetal toxic responses dose:	Biologically significant changes in litters were only noted in pups from high dose dams. These pups exhibited decreased body weights and weight gains as well as decreased post-natal survival at various time points between Day 0 and Day 4. The incidence of pups with no or small amounts of milk in their stomachs, and pups which were either missing (presumably cannibalized) or found dead was also higher from dams exposed to the highest dose. No effects were noted in the two lower dose groups in the reproductive parameters assessed (reproductive performance, gestation length, pup survival rate, pre-natal loss, number of implantation sites, number of live and dead pups, pup sex ratio, body weights and weight gains) which were comparable to controls.
Statistical Methods:	Homogeneity of data was evaluated using Bartlett's test, one-way analysis of variance (ANOVA), and Dunnett's t-test to indicate statistical significance. When the variances of the means were not considered equal by the Bartlett's test, the data were evaluated using a Kruskal-Wallis H-test followed by Mann-Whitney U-test. The reproductive performance of the dams and the fertility and fecundity indices were evaluated in contingency tables, using a Chi-square test. The total number of pups per litter (live and dead) and the total number of live pups per litter were evaluated using a linear regression model.
Remarks:	
<b>Conclusions</b>	It was concluded that CHDM was not teratogenic. While slight evidence of fetotoxicity was noted, this occurred at levels that induced significant maternal toxicity.
<b>Data Quality</b>	
Reliability:	
Remarks:	Reliable without restriction This was a well-documented OECD guideline study conducted under GLP assurances.
<b>References</b>	Reproduction/Developmental Toxicity Screening Test in the Rat. Toxicological Sciences Laboratory; Health and Environment Laboratories, Eastman Kodak Company, Rochester, NY; Study Number HAEL 95-0202; October 7, 1996.
<b>Other</b>	

#### F. Toxicity to Reproduction

See robust summary E above which was a combined developmental/reproductive toxicity screening assessment.